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McGRAW-HILL BOOK NOTES

OCTOBER, 1924

Fifteenth Anniversary Number

Special Features

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By DEAN L. C. MONIN
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Pictures of College Buildings
(pages 8 and 13)

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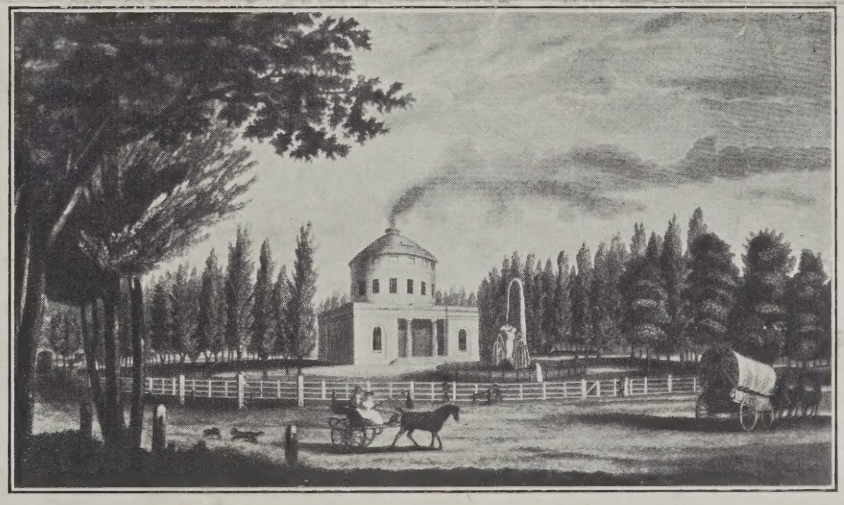

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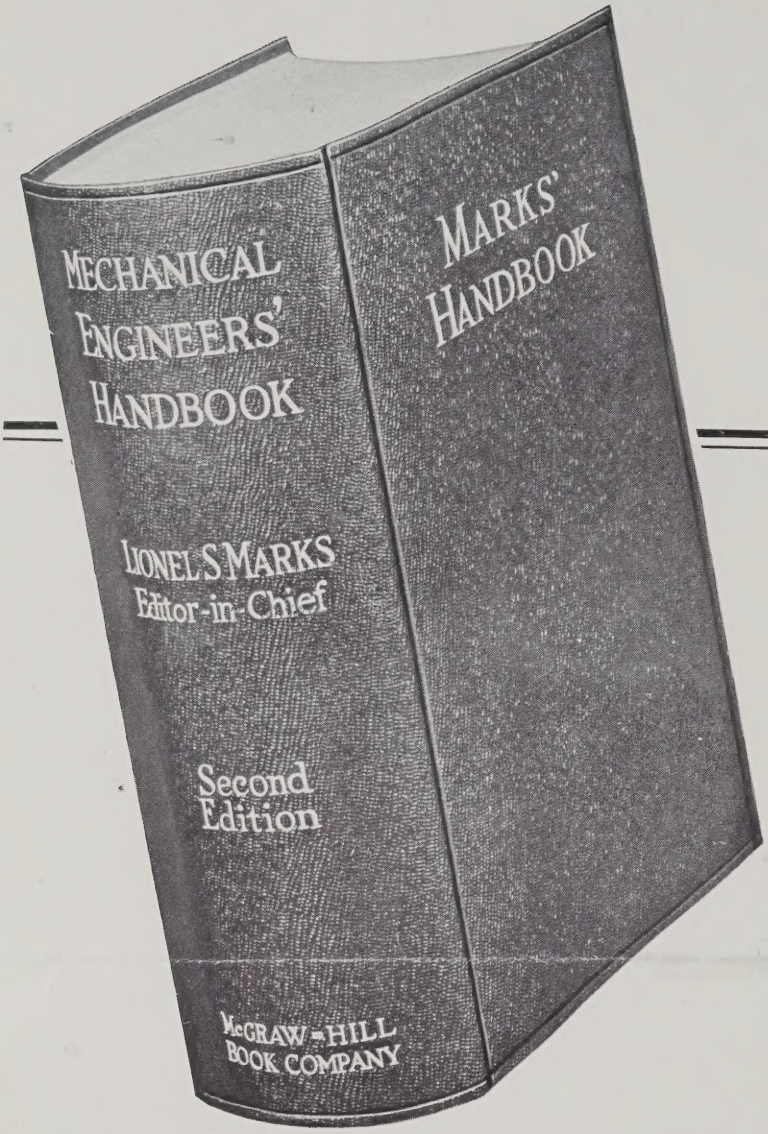

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McGraw-Hill Book Notes

OCTOBER, 1924

Liberalizing Studies in the Curriculum of Engineering Courses

By Louis Celestin Monin, Ph. D.

Dean and Professor of Economics and Philosophy, Armour Institute of Technology, Chicago

A few years ago, the late professor Josiah Royce of Harvard University made this statement, "To simplify men's moral issues, to clear their vision for the sight of the eternal, to open hearts for loyalty, this would be a peculiarly precious mission."

The teaching of engineering subjects frequently leads us to lose sight of the fact that an engineering education is, after all, not a problem of engineering but a problem of education. And all education includes—besides the training for scholarship—the acquisition of culture and the development of character.

Performance and Personality are the two aims of all training. The student must be taught and trained to render service—specific service, as mechanical engineer, electrical engineer, etc. The question of Performance is paramount in the attempt to equip the student with the knowledge and skill necessary to make a living and to hold up his end in the competitive struggle of mankind.

Engineering Colleges have constructed curricula crowded with fundamental technical studies, all of them of practical utility and with commercial value. But, in order to "see life steadily and see it whole," the scientific type of collegiate education must be infused with the broadening and inspiring spirit of literary and philosophical thought. A few untechnical, unprofessional studies, "containing the elements which draw forth the undeveloped man within" must be introduced into the engineering curriculum.

Bulletin No. 45 of the National Research Council on "Minimum Specifications for Highway Engineering Positions" contains specifications of the requirements of the various positions in the highway field from rodman to bridge engineer. It is the first essential step in determining more definitely what are the "fundamentals" of engineering education. By "fundamentals" the Bulletin understands Mathematics, Physics, Mechanics, etc., in short the technical subjects preparing the student for service:—Performance. The classification of the different subjects under the heads of fundamental studies, professional studies, cultural studies, liberal studies, etc., is not easy. Again, the terms,

Louis Celestin Monin

"liberal" and "cultural" are rather elastic and may include few or many of the subjects supplementary to the fundamental engineering subjects.

Man must master *life*. Engineering is only *one* aspect of man's endeavor to make life secure, enjoyable, and worth while. The engineer also has to deal with men. He must "understand, interest, influence and control human beings." He must grapple with human problems—his own and those of others—with defeat and disappointment. He must experience the joy of achievement and of victory and his character must stand the test of both failure and success. The curriculum of the engineering course, therefore, should be a combination of utilitarian and cultural studies. The latter—developing Personality,—are in a sense as fundamental, viz. *important* as the former.

Very frequently the engineer complains of spiritual isolation. Why are not more engineers in the public positions or called upon to guide civic movements and social affairs? In many cases it is because of his narrow attention to professional work alone. Skill and knowledge conquer matter; insight and wisdom conquer men. The educational progress of the individual is not merely a change from elemental to intermediate and advanced studies; or from an A.B. or S.B. course to the Master of Science and finally Doctor's diploma. Educational progress goes from *knowledge* to *understanding* and from that to *insight* and *wisdom*. The acquisition of knowledge implies observation, experiment, training of the senses, and the power of paying attention. Understanding calls forth the thinking, comparing, and logical processes of the mind. Insight means intuition and imagination. Wisdom, in the training of the will and shaping of personality, sums up all the other mental processes.

The question then arises, what subjects are best fitted to give knowledge, understanding, insight, and wisdom to the student. Most of the fundamental engineering subjects appeal chiefly to knowledge and understanding. Few, however, interest the imagination or inspire the difficult Art of Living, and prepare the comprehending man.

It would seem that no apology is needed, therefore, for the introduction of a few liberalizing studies into the curriculum of engineering colleges. Is there room for them? The explanatory sheet to the Bulletin No. 45 contains this remark:

> "The amount of class-room time given in engineering curricula to calculus, for example, at present varies from 50 to 240 clock hours. The pressure from all departments for more time is increasing. The demand from the profession for more thorough mastery of "fundamentals" is insistent. Can the needs of the profession be adequately met in four years of schooling? Who has the engineering data for a convincing reply?
>
> "Experience indicates that the process of specification and two-fold analysis as above (in the bulletin) outlined is a practical method of determining what are the fundamentals of engineering education and what must be taught to every engineering student. On the basis of such a determination it is possible to answer the foregoing questions and to construct engineering curricula in which the proper proportion of time is given to all essential elements."

Keeping in mind, however, that the function of all education is to pay attention to *two* "fundamentals": Performance and Personality, room *must* and, therefore, *can* be made for them.

The studies usually called "liberal" or "cultural" are History, English, Economics, Philosophy, and Literature. In order to fit into the professional curriculum of the engineer, text-books of these studies must be rewritten, condensed, and simplified.

Many years of experience in the Armour Institute of Technology have taught the writer that engineering students are as eager for a message of good will and cheer and for the broadening outlook on life that follows the occupation with History, Philosophy, or Literature as are the students in colleges of Arts and Science. Members of engineering faculties often make the mistake of telling their students repeatedly what an *Engineer* needs ("Engineer" written with a capital "E".) But, the young student who is passing from boyhood into manhood often wonders what the *Man* needs.

Society and the State demand their right and urge the schools to plan not merely for the needs of the individual, but also to provide him with qualifications which the community will some time ask of him. The student must think not only in terms of his own development. He must learn to march in step with his time and civilization. The ideals of life are spread far and wide. Young hearts are hungry to reach them—to formulate and to apply them. The depositories of the achievements of the race and the spiritual development of mankind are Literature, History, Psychology, Economics, Philosophy, and Religion. It is not claimed that these should have *equal* importance in the engineering curriculum as the depositories of the material development of civilization, namely, Natural Sciences, Mathematics, Mechanics, and the innumerable engineering subjects. Part of the daily or weekly program, however, must be devoted to the "Liberalizing" course of study if graduates of the engineering colleges are to enter life with a broader outlook upon men and affairs so necessary for complete living.

Twenty-five years ago the Armour Institute of Technology, Chicago, adopted and put into practice a curriculum which contains a few subjects tending to "liberalize" the student's mind from too close attention to mechanical and exact scientific studies. The courses in Mechanical, Electrical, Civil, Chemical, Fire Protection Engineering, and Architecture are all arranged on the same plan and contain, in addition to their specific professional technical subjects, the same cultural studies distributed over the four years.

During the Freshman year the course in English Rhetoric and Literature, two hours per week, is a continuation of the four year high school training in that subject. It is accompanied by a course in the History of Civilization, a lecture course, one hour per week. The students are required to take notes and are given book references for outside reading. In the Sophomore year, the course in English is continued for one hour per week. To this course are added lectures on Political Science and the History of Recent Times, one hour per week. For the Junior year a course in Economics, two hours per week, and another course in General Literature, one hour per week, are provided. Both courses are given by lectures with some required outside reading. The liberalizing courses for the senior year comprise a two-hour course in the Introduction to Philosophy (Logic, Psychology, Ethics) and a one hour course in Public Speaking.

These cultural studies are not elective but form an integral part of the four year curriculum. Together with the Shop courses and Physical Training they are supplementary to the professional and fundamental subjects.

In regard to the amount of time alotted to these subjects, an analogy is found in everybody's daily work. What is the distribution of time and strength of *all* our activities and interests. They may be divided into three classes—first, activities and interests *fundamental* in the shaping, maintaining, and developing of our lives; second, activities and interests that are supplemental to these; third, those that are merely incidental (social affairs, theatre, and the like.)

In like manner the studies of the curriculum may be classified as fundamental, supplemental, and incidental. Man must devote most of his time and strength to the fundamental activities whereby he makes his living. The fundamental studies of an engineering curriculum must also occupy most of the student's time and strength—roughly considered, perhaps 65 to 70 per cent. Supplementary studies and activities may then occupy 20 to 25 per cent and the remainder of the time, strength, and enthusiasm may be given over to incidentals.

After many years of experience the members of the faculty of the Armour Institute of Technology are convinced that the curriculum as arranged in our College of Engineering does not suffer from the inclusion of the "liberalizing" studies.

Students welcome the change from close attention to exacting technical studies to a lecture on "something else" and appreciate the relaxing and yet stimulating influence of an hour with Economics or Philosophy.

Graduates who occasionally visit their alma mater or who speak at alumni banquets assure us that the time allowed for the "liberalizing" studies was not wasted. Frequently the demand is made by them to give rather more than less attention to such subjects. An hour or two per week less of Calculus or of Shop Work, or of Drawing, etc., and a few more lectures on the "Great ultimate problems which the world puts to the thinking mind of man" will not seriously affect the program as arranged for the professional studies and will bring good results.

What the student wants is a living sustenance, interpretative ideas, and the critical spirit of philosophy "which is at the same time a creative spirit." They are eager for organizing and vivifying knowledge that should do more for them than give information. Essentials and principles are wanted. A point of view is wanted, an acquaintance with the great thoughts of the spiritual leaders of humanity. Students who have been trained by so many specialists often show, in many ways, a "poverty stricken inner life" and in general are burdened with a mass of uncoordinated knowledge.

Engineering subjects are taught in a technical sense without human or philosophical implications, but this does not absolve the College of Engineering for neglecting "Liberalization" of the mind from particularism and provincialism in matters of social, economic, political or religious importance. Perhaps a professor of "Things in General" could be added as a valuable member to the faculty of each Engineering College. Now as ever Emerson's word is true:

"Web to weave and corn to grind
Things are in the saddle and ride mankind."

Modern science with its mechanistic point of view rarely has sustaining power in a crisis of life. Students like many older people feel the need of peace between the religious view of the world and the scientific explanation of nature.

A word of caution is needed: If a clear understanding of spiritual values is to be secured, then the *Maximum to be presented to the student must be a Minimum.* The statement, "A curriculum which stresses details is wasting time" is equally binding for technical and cultural subjects. Here especially a wise selection of topics has to be made. The presentation must be vigorous, stirring, provocative. It is not a question of solving problems or answering questions, but of propounding and raising them. Let the student himself ponder over them and pursue his career after acquaintance with a wider range of interests and a life more abundant on account of the wide horizon of his inner life.

Where many special subjects are taught in so many different lecture rooms, laboratories, and shops, a professor of "Things in General" coordinating, organizing and surveying the entire field of knowledge would be a blessing to the young man eager to face life in all its aspects.

It is a matter of course that the "liberalizing" subjects must be taught differently in the Engineering College than in University courses. In the University *all* of a science is

(*Continued on page 17*)

The Cloaca Maxima. From Williams' DESIGN OF MASONRY STRUCTURES AND FOUNDATIONS.

The 1924 Ketchum

There's a fine, big book with a handsome red flexible cover on our shelf of new books—the new third edition of Ketchum's *Structural Engineers' Handbook*. It looks like the trusted, authoritative, important work it is, and the host of teachers who have used the *Structural Engineers' Handbook* these many years will welcome this revision, we feel sure.

The 1924 *Ketchum* is 130 pages bigger than the previous edition.

Some of the more important additions are:

- ..a chapter on Self-supporting Steel Stacks;
- ..properties and details of Constant Dimension Steel Columns and Steel Footings;
- ..revised specifications;
- ..new data on mill buildings, office duilbings, bridges, retaining walls, stiff frames and eccentric riveted joints;
- ..new properties of Carnegie and Bethlehem sections.

The book is a source book designed to supply data, details, specifications and tables on the design and construction of steel bridges and buildings. The material consists of carefully digested facts indispensable to anyone interested in structural design.

There are 295 tables covering:

Bars and Plates—I-Beams—Channels—Angles — Miscellaneous Sections — Columns and Struts—Top Chord Sections—Plate Girders—Details for Bars—Pins, Bolts and Nuts—Rivets and Riveting—Beams and Lateral Connections—Bethlehem Sections—Steel Column Footings—"Constant Dimension Columns"—Mathematical and Miscellaneous.

Watch for the Boyd Adoption List

It's too early to make up an adoption list of the new third edition of *Strength of Materials* by Professor Boyd of Ohio State University—our records at this writing are not up to date because of the rush of fall orders. But when the list is made up it will be imposing, for the first big printing of the book has been practically exhausted in four months' time.

From first publication in 1911 Boyd's *Strength of Materials* was widely adopted. Yet this new third edition will show a longer adoption list than ever before in the book's history.

Most of the problems in this new edition have been rewritten and other changes have been made in the interest of simplification.

The book gives the student a grasp of the physical and mathematical ideas underlying the mechanics of materials together with enough of the experimental facts and simple applications to sustain his interest, fix his theory and prepare him for the technical subjects of machine design, reinforced concrete and stresses in structures.

A good companion volume is Boyd's *Mechanics*.

A Bad Habit

Seasonal operation in the construction industries is just a bad habit, according to the Committee of the President's Conference on Unemployment appointed by Secretary Hoover to investigate the matter.

The report of the Committee points out that seasonal operation is due largely to customs which became fixed long ago when builders had not yet learned to cope with adverse weather conditions, and that seasonal peaks can in large measure be avoided today in this country.

The whole report, which we have just published under the title of *Seasonal Operation in the Construction Industries: The Facts and the Remedies*, is well worth reading. It outlines definite plans for overcoming the power of custom and human inertia so that construction activities may be spread over the entire year. Mr. Hoover in his Foreword suggests how important such a spreading out would be not only to the building trades but to the materials producing industries.

The Hool and Kinne Series Now Complete

With the publication of Hool and Kinne's *Reinforced Concrete and Masonry Structures*, the Hool and Kinne Series is completed. The series purposes to provide the engineer and the student with a text and reference work covering thoroughly the design and construction of the principal types of modern civil engineering structures. Each of the six volumes is the work of a staff of specialists under the editorship of Professors Hool and Kinne of the University of Wisconsin. Much of the material has never before been available in book form and most of it is based on the records of actual practice. The titles of the six volumes are:

Foundations, Abutments and Footings
Structural Members and Connections
Stresses in Framed Structures
Steel and Timber Structures
Reinforced Concrete and Masonry Structures
Movable and Long-Span Steel Bridges

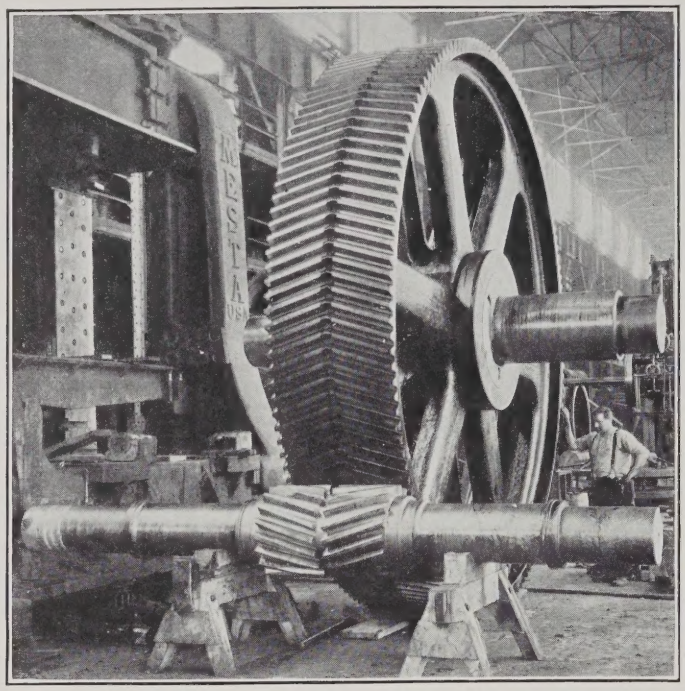
Each of the volumes has been adopted in a number of colleges.

Just Published
STRUCTURAL ENGINEERING
Strength of Materials
By George Fillmore Swain
Gordon McKay Professor of Civil Engineering, Harvard University
565 pages, 6x9, illustrated

The first volume of a series treating of the theory and design of structures, embodying the course which Professor Swain has been giving for many years.

This first book gives a complete, clear and simple discussion of the fundamental principles of the strength of materials applicable in the design of structures of various kinds. It contains all that is needed for machine design and so is suited for any student of engineering.

Professor Swain's method of presentation is somewhat novel and the book includes original points of view and methods.



Large herringbone gears for bearing work in steel mills. Mesta Mfg. Company. From Smith's ENGINEERING KINEMATICS.

The Marks Habit is an Excellent Undergraduate Habit

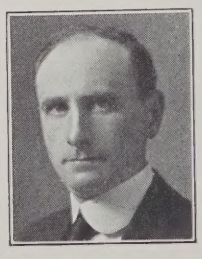
The nucleus of an engineer's library in college and afterwards may well be Marks' *Mechanical Engineers' Handbook.*

The value to an engineer of a handbook is greatly enhanced by familiarity with the book, with its arrangement, and with its general range of topics. Until he is well acquainted with *Marks' Handbook*, the student will not realize the diversity of topics treated or the aids to calculation which it contains. The habit of referring to this book will broaden the knowledge of the student and will increase his value to his future employer. Moreover, he will find in it a resumé of most of his courses. The student who forms early the habit of using *Marks' Handbook* will find that that habit will profit him throughout his professional career.

Graham L. Montgomery in a review in *Chemical and Metallurgical Engineering* calls the new 1924 second edition of *Marks' Handbook*, "the handbook of universal utility."

Perhaps the following facts about *Marks' Handbook* led Mr. Montgomery to make this statement:

1. *Marks' Handbook* contains a complete epitome of the mathematics used by engineers, from arithmetic and geometry to differential equations and vector analysis; in addition it contains four-place mathematical tables of all the functions commonly used, including trigonometric and hyperbolic functions, compound interest tables, and conversion tables. The advantage to the student, both in college and after graduation, of having in one volume a summary of all the mathematics he has learned, and of all he is likely to need, cannot be overestimated.
2. The section on Heat in *Marks' Handbook* contains the thermal properties of matter and the theory required in connection with all courses in which technical heat problems arise. Heat transmission, thermodymanics, heat-power cycles, refrigeration, evaporation and drying, flow of gases and vapors, combustion and gastification of fuels are some of the major topics. No better condensation of present-day knowledge in this field is to be found in the English language.
3. The foundation of an engineering education is the study of mechanics and its allied subjects. The student needs a summarized statement of the methods, formulae and constants of these subjects for use in design and other courses, and in his professional work later. He will not find a better summary than that contained in Sections 3 and 5 of *Marks' Handbook*. It will be invaluable to him to learn to use it early.
4. An engineer has to use materials; for information on the properties of, specifications for, and methods of handling, engineering materials, some reference work is necessary. In *Marks' Handbook* the services of twelve specialists have been enlisted to secure authoritative data on the numerous materials with which the engineer has to deal. Among the more important topics are metals and their alloys, cement and concrete, timber, fuels, lubricants, abrasives, insulating materials, paints, and explosives. The student will not require information on all of these, but he will find such information as he seeks and will learn where to look for further information when he needs it.
5. In design courses, it is necessary that the student should have available all that he has studied of mathematics, mechanics, resistance of materials, and properties of materials, and in addition he should have at hand a comprehensive treatment of machine elements. He will find all these in *Marks' Handbook*, the theory in each case having been written by a distinguished teacher of the subject. The section on machine elements gives standard practice and theory of screw and rivet fastenings, shafts and cranks, bearings, gearing, pulleys, rope, belt and chain drives, pipe and pipe fittings, and all commonly occurring elements. It is a mine of information for the practitioner and for the student.
6. The latest word on the design, construction, testing and performance of boilers, steam engines, steam turbines, condensers, gas and oil engines, and hydraulic turbines is available to the student who uses *Marks' Handbook*. No single text book covers this range of subjects so completely. It should be in the hands of every one whose work includes the power-plant field.
7. No other book in the English language covers as fully as *Marks' Handbook* the needs of the mechanical engineer engaged in carrying out laboratory investigations. The section on measuring instruments describes and discusses the use of various types of apparatus and instruments. Every student should have a copy of this book when engaged on laboratory work.



Left—ANDREY A. POTTER, Dean of Engineering Purdue University.

Right—JAMES P. CALDERWOOD, Professor of Mechanical Engineering, Kansas State Agricultural College.

"Better Than Ever"

"Better than ever" seems to be the verdict on the new third edition of French's *Engineering Drawing.*

Professor Frank L. Eidmann of Princeton University writes:

> "The previous edition of French was excellent, but this new edition includes several worth-while improvements which make it even better."

Professor Fred S. Griffin of the University of Akron writes:

> "I have long considered this book to be the best written engineering text that I know of and about the only way I can express my appreciation of the new edition is to state that it is better than ever."

Professor C. M. Potter of Alfred University writes:

> "French is the best text I have ever used and the new edition promises to be even better than the old."

Professor Philip K. Slaymaker of the University of Nebraska writes:

> "We have used French for a number of years and know of nothing better except this new edition."

Professor Verne C. Frylunk of Nebraska State Teachers College writes:

> "I am glad to say that it is still the only real college text on drawing in existence. It is better than ever."

The new French was published May 29, 1924. Two big printings have been practically exhausted and a third is now on press.

The Plan of Potter and Calderwood

When Potter and Calderwood's *Elements of Steam and Gas Power Engineering* was first published in 1920, teachers who wanted a clear and concise introductory text on the principles underlying the construction and operation of steam and gas power equipment found it an ideal text for their purpose.

Now a new edition with additional problems and improved illustrations and a new chapter on Units and Definitions is ready.

The main portion of the book is divided into three parts.

The first part takes up the subject of steam power; the second is devoted to gas power, and the third treats of the application of steam and gas power to locomotives, automobiles, trucks and tractors.

Each chapter follows a definite outline: first, the fundamental principles underlying the particular phase of equipment under consideration are discussed; second, the structural details are described; third, the auxiliary parts are treated, and fourth, the operation and management of the equipment are considered.

Odd Notes

French and Svensen's *Mechanical Drawing for High Schools* is now more widely used than all other books of its kind together. 911 schools have adopted it.

* * * * *

A new second edition of French and Turnbull's *Lessons in Lettering, Book I,* in lithographed form, is now available. Teachers tell us the French and Turnbull lettering practice copy books help to take the drudgery out of lettering practice.

* * * * *

Have you looked up in Smith's *Engineering Kinematics* the short introductions which open each chapter?

* * * * *

We have in press *Electrical Drafting and Design* by C. C. Bishop of the Buffalo, N. Y., Technical High School.

Four-Wheel Brakes, Balloon Tires, Etc.

The latest developments in automobile construction are fully covered in the new third edition of Hobbs, Elliott and Consoliver's *Gasoline Automobile.* The book has been completely rewritten to reflect latest practice.

Some of the features that have made this University of Wisconsin Extension Text so popular with teachers of automobile construction and operation are:

- ..the logical treatment of the essentials;
- ..the remarkable clearness of the explanations;
- ..the excellent chapters on the engine;
- ..the thorough discussion of the electrical equipment of the automobile;
- ..the numerous diagrams.

For Vocational Schools

We published a few months ago Dr. Payne's *Administration of Vocational Education,* mentioned in the Fifteenth Anniversary Supplement, on page 10 of this bulletin. The book makes the first thorough-going analysis of the Federal Vocational Education Law (Smith-Hughes Act)—its purpose, its plan, its method, and its possibilities and limitations.

* * * * *

Mr. L. Raymond Smith of the Dickinson Technical and Industrial High School of Jersey City, N. J., is the author of *Industrial Physics—Mechanics,* now widely used in representative vocational schools. The second volume of this three-book series, *Industrial Physics— Heat* is now ready.

* * * * *

The new second edition of Norris and Smith's *Shop Arithmetic,* one of the most widely-used of the University of Wisconsin Extension Texts, contains two new chapters on Logarithms and on the Slide Rule. This additional material is included for the benefit of those students who plan to go forward with subsequent studies in industrial and engineering courses.

* * * * *

Practical Calculus for Home Study by Professor Palmer of Armour Institute of Technology should prove of interest to teachers in vocational and extension courses.

* * * * *

We have in press the following vocational school texts:

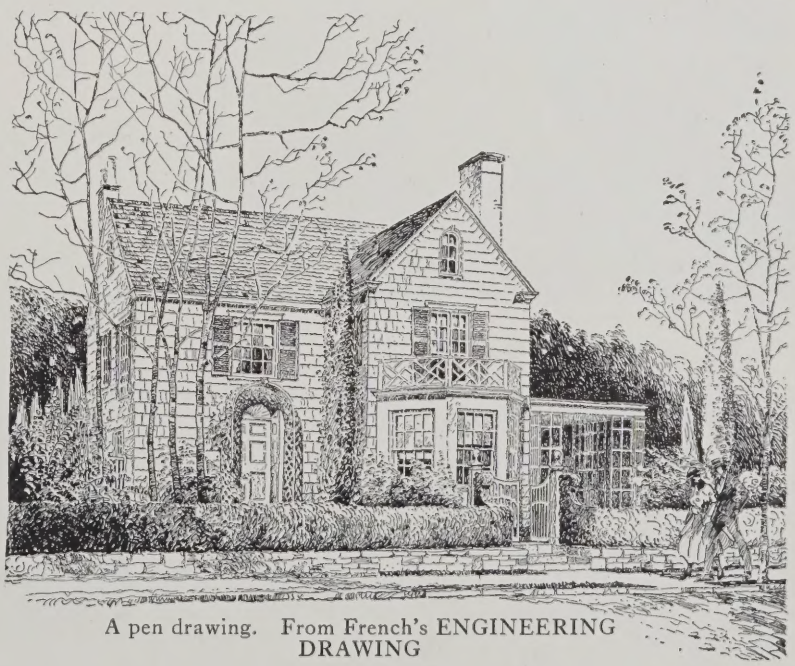
Carver and Briggs—*Practical Bricklaying.*

Schuhler—*Electric Wiring.*

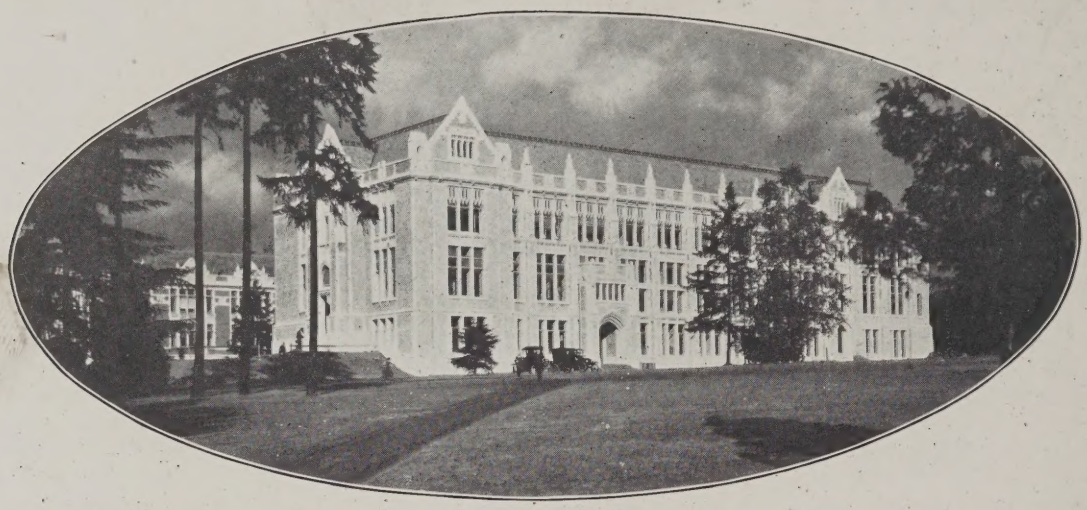
Rosengarten—*Choosing Your Life Work.*

Levitas—*Printing and Typography for Beginners.*

Consoliver—*Automobile Electricity.*

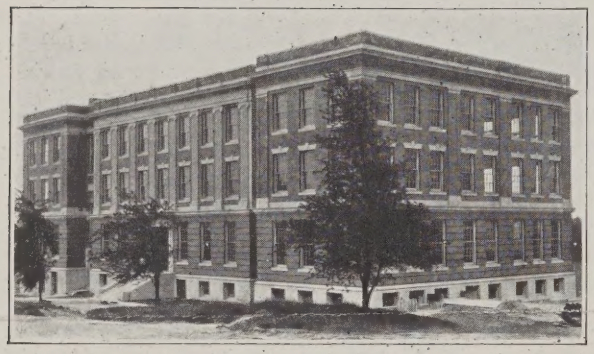


A pen drawing. From French's ENGINEERING DRAWING



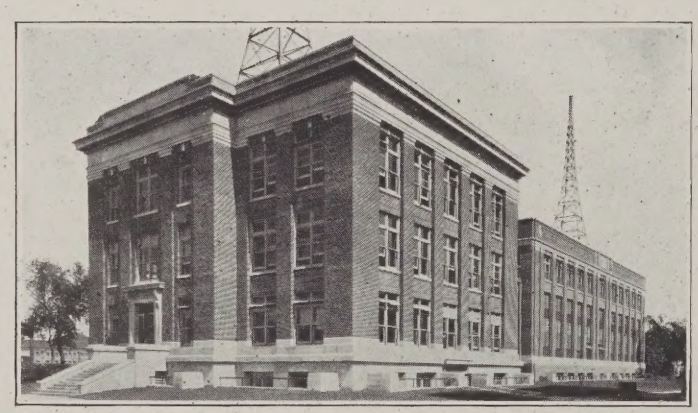
Educational Hall
University of Washington
Seattle, Wash.

Some Recent College Buildings

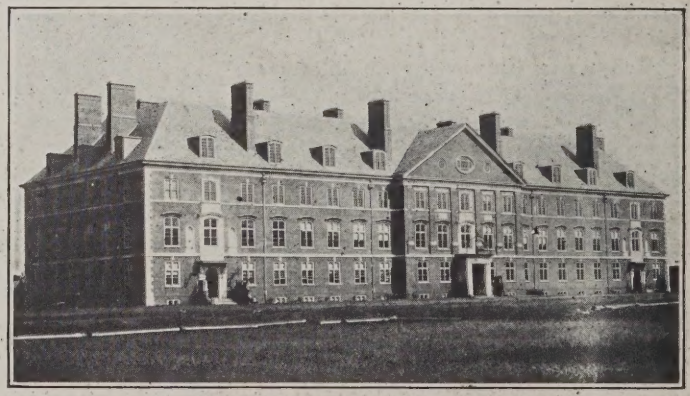


Chemistry Laboratory
Tufts College
Tufts College, Mass.

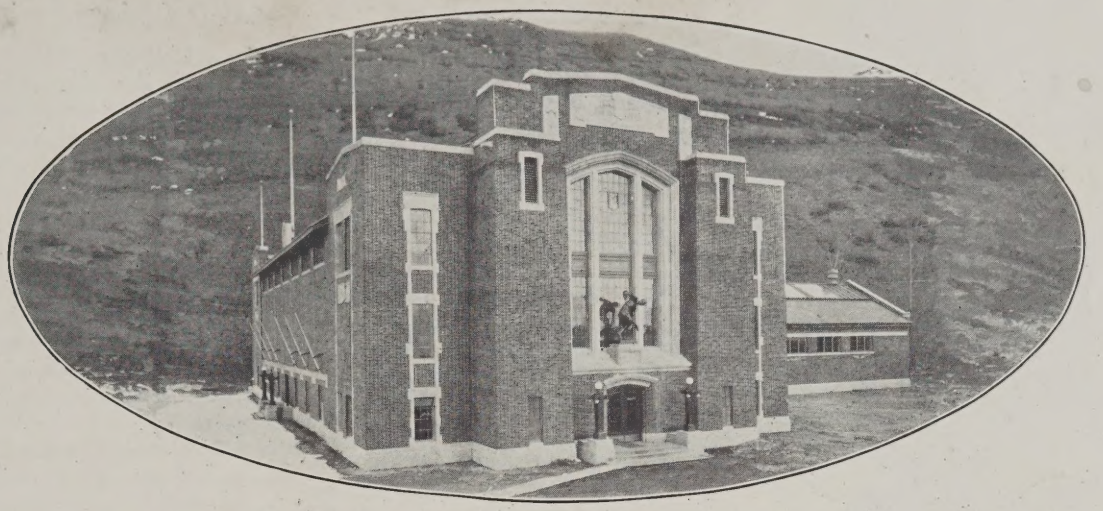
Gressmann Chemistry Laboratory
Massachusetts Agricultural College
Amherst, Mass.



Electrical Engineering Building
University of Minnesota
Minneapolis, Minn.

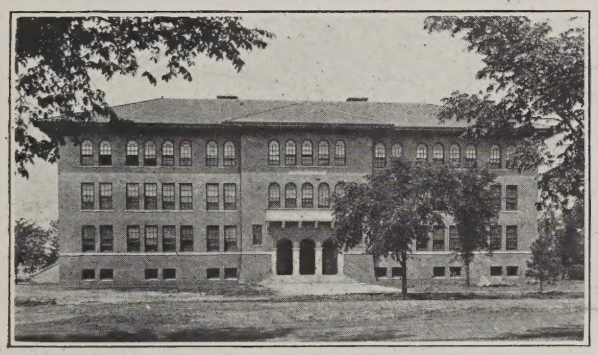


Agricultural Building
University of Illinois
Urbana, Ill.

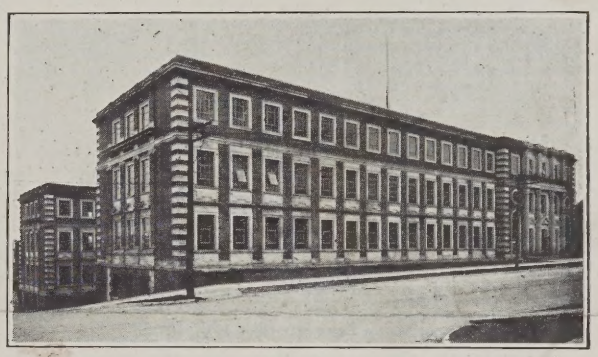


Gymnasium Building
State University of Montana
Missoula, Mont.

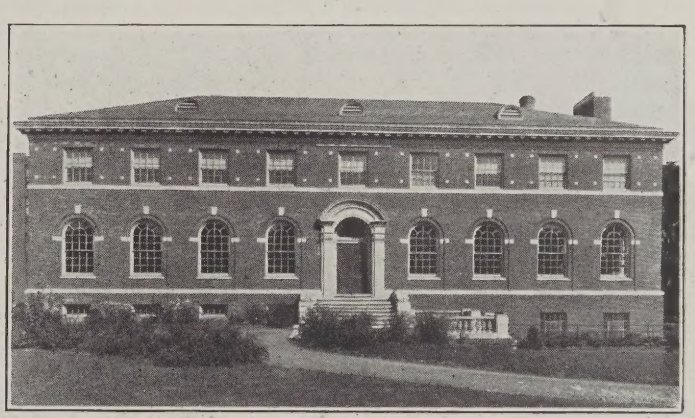
Some Recent College Buildings



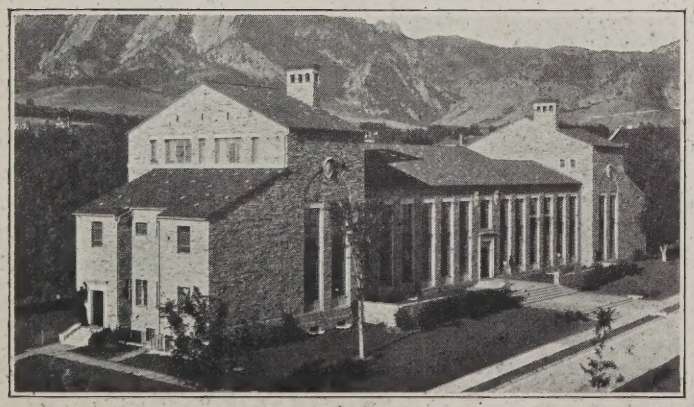
Agricultural Building
North Dakota Agricultural College
Agricultural College, No. Dak.



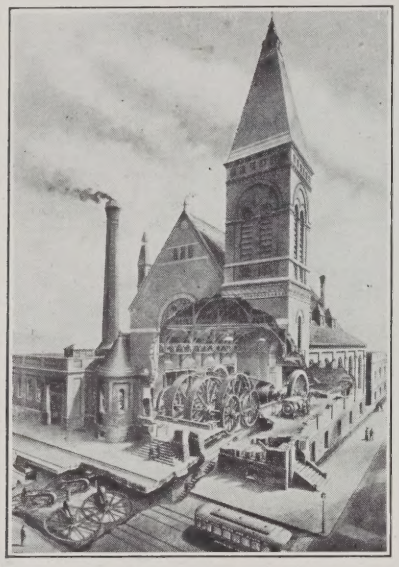
Chemistry Building
State University of Iowa
Iowa City, Iowa



Ceramics Building
Rutgers University
New Brunswick, N. J.



Arts and Architecture Building
University of Colorado
Boulder, Col.



It was a triumph over the horse car when the cable road was conceived. This great "Power House" in Baltimore dates back probably to the 80's. Mechanical engineering had been applied for the first time to "Rapid Transit." Boilers, engines, great belts, flywheels and cable transmissions were to give life to car propulsion in the streets. From Lauer's ENGINEERING IN AMERICAN INDUSTRY.

Old Friends Are Best

This year we have brought out a greater number of revisions of standard texts than in any previous year. The popularity of these revisions leads us to believe that after all it is true that "old friends are best."

Among the revisions that may be called, after the manner of the theatre reviewers, "real hits," is the new third edition of Gray's *Principles and Practice of Electrical Engineering.*

For some time teachers had been asking us whether or not we would keep the late Professor Gray's classic text up to date, and finally we persuaded Professor R. F. Chamberlain, long associated with Professor Gray at Cornell, to undertake the revision. The method and scope of the book have not been changed but all the material has been brought up to date and new problems have been added.

A More Elementary Dawes

Every volume of our series of Electrical Engineering Texts has proved a particularly valuable text. We are therefore glad to be able to announce another volume in the series—*Industrial Electricity—Part One* by Professor Dawes of Harvard University.

Dawes' *Course in Electrical Engineering* (Volume I—Direct Currents and Volume II—Alternating Currents) is used in 106 schools and colleges. This new book, *Industrial Electricity*, is a more elementary text to meet the requirements of beginners in technical high schools, vocational schools and evening classes.

Five Points About the New Rowland

A second edition of Rowland's *Applied Electricity for Practical Men* is now ready.

Here are five points of interest about the book:

1. It is the only book giving an adequate and satisfactory explanation of alternating current phenomena, especially of three-phase apparatus and circuits, with the need of no more mathematical ability than required to understanda very simple equation or formula.
2. The book keeps strictly to those subjects, the theory of which is of value to men associated with lighting and power work in the central station industry; to those managing independent or manufacturing electric plants or supervising the systems and apparatus installed in them; to wiremen and installers of electric lighting and power equipment; to repairmen on electric equipment for power circuits.
3. In a volume of reasonable size, the subjects discussed have been covered with reasonable thoroughness. Books intended for electrical workers are apt to cover the whole field of electrical theory and application. As a result they are very superficial or are very bulky volumes.
4. The author of this book has had many years of personal experience in teaching electrical workers of all sorts, both in school work planned for industrial workers and in direct connection with the electrical industry itself. He knows the difficulties encountered by those who have not had wide educational opportunities and has learned by long experience how to arrange study material to satisfy those who need practical knowledge of the theory behind their daily work.
5. This book in its previous edition has been used continuously year after year, in vocational and corporation schools in many parts of the country and has established itself in the confidence of a large number of industrial establishments.

Public Utility Valuation

W. H. Maltbie is well known for his work in public utility valuation, rate-determination and taxation. He has put the gist of his long experience into a sound, sane book—Maltbie's *Theory and Practice of Public Utility Valuation.* It shows how valuations that are fair to the public; fair to the investor, and fair to the community, present and future, may be secured. It takes up such topics as original cost, capitalization, market value of securities outstanding, cost to reproduce new, overhead charges, depreciation, present value, rate of return, etc.

Quoting From Still

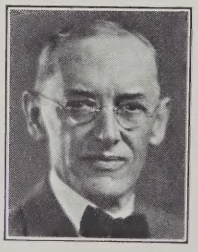
The following are excerpts from the Introduction to *Elements of Electrical Design* by Professor Still of Purdue University. This is a new book—not a revision of Professor Still's *Principles of Electrical Design,* which is still available for the many teachers who use it.

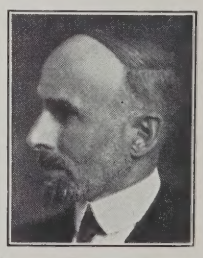
"This book treats of the elements of electrical design, and the earlier chapters deal respectively with the electric circuit (resistance and I^2R losses), the magnetic circuit (design of electromagnets), and the electrostatic circuit (design of insulators.) In later chapters various machines and pieces of apparatus are considered, and a number of problems in design are worked out numerically with a view to showing how the fundamental principles discussed in the opening chapters are applied in the design of practical machines.

"In explaining procedure in design an attempt has been made to base all arguments on scientific facts, and to build up a design in a logical manner from known fundamental principles.

"Because of the close connection between mechanical and electrical engineering, especially in the work of the engineer, it has seemed desirable to include one chapter dealing with the mechanical features of electrical machine design. This is Chap. XVII at the end of the book.

"A feature of this text which calls for a few words of explanation is the inclusion of 'Test Problems' at the conclusion of the chapters. These are short problems to which the anwers are given, and they are of an entirely different nature from the design problems in the body of the text, which are examples in design worked out in detail. The test problems are not necessarily design problems, but if the reader is able to solve these without reference to the text, this will be an indication that he has a fair knowledge of the subject dealt with in the chapter to which these problems refer."





Left—W. H. MALTBIE, Consultant on Public Utility Valuation, Rates and Taxation. Photo by Cronhardt and Monios, Baltimore.

Right—ARTHUR W. SMITH, Professor of Physics, University of Michigan,

Brief Electrical Items

Professor Smith's *Electrical Measurements* has undergone a slight change of title as well as a thorough revision. The new title is *Electrical Measurements in Theory and Application*. The elastic organization and arrangement of the book renders it available for a wide variety of courses.

* * * * *

Richey's *Electric Railway Handbook* is available in a new second edition. All the material has been brought into accord with the latest development in the electric railway field.

* * * * *

A new edition of Blake and Jackson's *Electric Railway Transportation* will be published in October.

* * * * *

The latest Croft book is Croft's *Electrical Machinery and Control Diagrams.*

The Science of Metals

Mr. Zay Jeffries and Mr. Robert S. Archer of the Aluminum Company of America have made in their *Science of Metals* a complete survey of the whole field of the structure and properties of metals.

It is the first book to give an extensive treatment to the important subject of grain growth in metals, and to the application of x-ray crystal analysis to metals.

The book contains a full exposition of the slip interference method of hardening.

It gives a complete correlation of the known facts about the hardening of steel.

It discusses not only the metals but also every commercially important compound and alloy.

The authors have gone over thoroughly the existing mass of information in the field, have picked the essentials, analyzed, verified and classified them, and in a clear, direct manner have presented a careful and reasonable statement of the fundamental principles of the science of metals.

The book has only just been published but it is already in use in several departments of metallurgy.

Left—ZAY JEFFRIES, Consulting Metallurgist, Aluminum Company of America.
Right—ROBERT S. ARCHER, Metallurgist, Research Bureau, Aluminum Company of America.

A Symposium on Spurr's Ore Magmas

The following excerpts from letters and reviews refer to *Ore Magmas*, the recent two-volume work by J. E. Spurr, Editor of the Engineering and Mining Journal-Press.

"I think your new book is a great contribution, and I congratulate you upon its appearance."—*A. N. Winchell, Professor of Petrology, University of Wisconsin.*

"I own a copy of your 'The Ore Magmas' and find it highly stimulating reading and constructive; in fact, it is the best thing on the subject that has ever been written."—*F. W. Pane, Mining Engineer, Secretary and Treasurer, Copper Range Mine.*

"The book is essentially a record of the results of the author's original work, and as such is full of inspiration."—*E. H. Davison, in The Mining Magazine, London.*

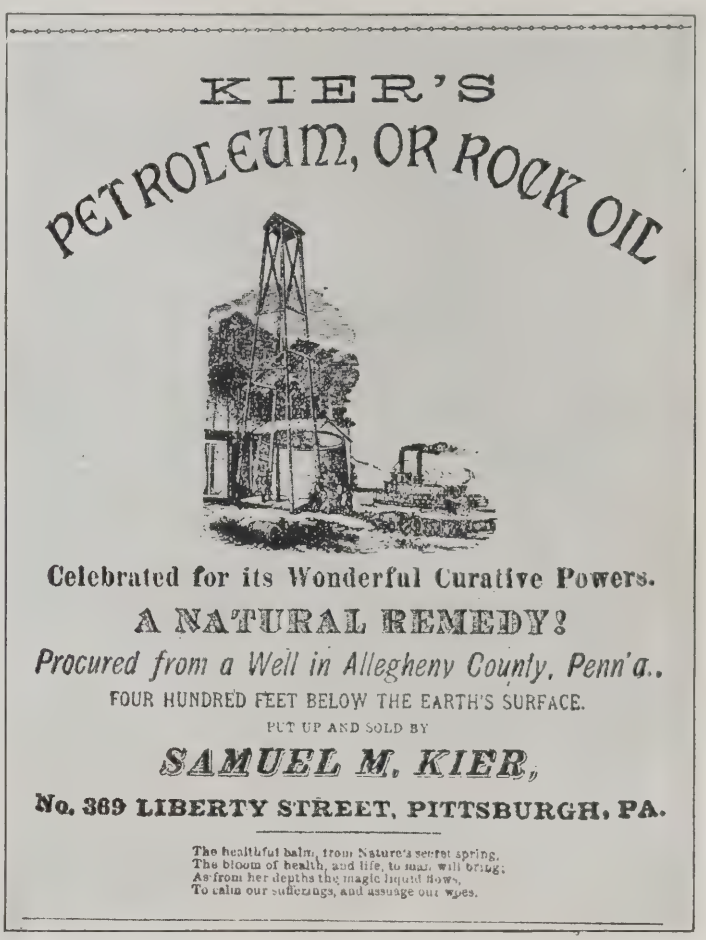
"Allow me to congratulate you on the publication of 'The Ore Magmas.' It is a great book, right on the point, practical, away from the old Professor style, a book we mining engineers have been shouting for."—*Frank H. Ahier, Mining Engineer, Minsterly, Shropshire, England.*

"I have read your 'Ore Magmas' through with great interest and am going over them now in more detail. Even when we get to the places where we do not agree, I am enjoying it!"—*Basil Prescott, Consulting Mining Geologist, El Paso, Tex.*

"I am reading your book on 'Ore Magmas' with a great deal of interest. It contains a wealth of information, and I am very glad indeed that you have published it. I agree with you in the main, perhaps not in all details. A good job well done."—*Waldemar Lindgren, Professor of Economic Geology, Massachusetts Institute of Technology, Boston, Mass.*

"Albeit somewhat tardily I have finally embarked on 'The Ore Magmas' and thus far have enjoyed a fair wind and safe navigation. From its present aspect I take it to be the biggest step forward since the announcement of the secondary enrichment theory in 1899."—*H. H. Knox, Mining Engineer, New York and London, Past President, Mining and Metallurgical Society of America.*

"So many facts of observation are described succinctly and lucidly, and are so well illustrated by numerous diagrams, that one cannot fail to grasp the writer's point of view, and the stages by which he arrived at his present opinions."—*H. I. Jensen, D. Sc., Queensland Government Mining Journal, formerly Geologist, Queensland Geological Survey.*


KIER'S
PETROLEUM, OR ROCK OIL
Celebrated for its Wonderful Curative Powers.
A NATURAL REMEDY!
Procured from a Well in Allegheny County, Penn'a.,
FOUR HUNDRED FEET BELOW THE EARTH'S SURFACE.
PUT UP AND SOLD BY
SAMUEL M. KIER,
No. 369 LIBERTY STREET, PITTSBURGH, PA.
The healthful balm, from Nature's secret spring,
The bloom of health, and life, to man, will bring;
As from her depths the magic liquid flows,
To calm our sufferings, and assuage our woes.

Reproduction of a circular issued by Samuel M. Kier, in 1850, a druggist of Pittsburgh, who noticed about 1849 the close similarity between the "American Oil" prescribed for the sickness of his wife and the petroleum obtained by his father from a brine well drilled to a depth of 400 ft. at Tarentum, Pa. From Bacon and Hamor's AMERICAN PETROLEUM INDUSTRY.

An Adoption List on Simons' Ore Dressing

Simons' *Ore Dressing*, published April, 1924, has already been adopted in a number of colleges of mining, among them—Montana, Nevada, Cincinnati, Carnegie Institute of Technology, Pittsburgh, South Dakota and Utah.

Milwaukee Sewage Disposal Plant, August 1923. From Bogue's THEORY AND APPLICATION OF COLLOIDAL BEHAVIOR. The subject of this illustration suggests the wide range of this important book.

A Survey of Colloidal Behavior by 34 of the Foremost Authorities

Bogue's *Theory and Application of Coloidal Behavior* presents a careful, thorough treatment of the theory of colloidal behavior and of the actual application of the science.

Dr. Robert H. Bogue is the editor. The contributors are:

Carl L. Alsberg, *Director*, Food Research Institute, Stanford University.

E. Frankland Armstrong, *Director*, Joseph Crosfield & Sons, Ltd., Warrington, England.

Wilder D. Bancroft, *Professor of Physical Chemistry*, Cornell University.

Eugene C. Bingham, *Professor of Chemistry*, Lafayette College.

Robert H. Bogue, *Director of Research* for the Portland Cement Association; formerly *Associate Professor of Chemistry*, Lafayette College.

E. Franklin Burton, *Associate Professor of Physics*, University of Toronto.

Joseph D. Davis, *Fuels Chemist*, Pittsburgh Exp. Station, U. S. Bureau of Mines.

Gustavus J. Esselen, Jr., *Vice-President*, Skinner, Sherman & Esselen.

Arno C. Fieldner, *Supervising Chemist*, Pittsburgh Station, U. S. Bureau of Mines.

Herbert Preundlich, *Professor* at the Kaiser Wilhelm Institute, Berlin.

H. W. Gillett, *Formerly Chief Alloy Chemist*, U. S. Bureau of Mines.

William D. Harkins, *Professor of Chemistry*, University of Chicago.

Joel H. Hildebrand, *Professor of Chemistry*, University of California.

Harry N. Holmes, *Professor of Chemistry*, Oberlin College.

Waldemar Lindgren, *Professor of Economic Geology*, Mass. Institute of Technology.

Jacques Loeb, *Late Member*, Rockefeller Institute for Medical Research.

James W. McBain, *Prof. of Physical Chemistry*, University of Bristol, England.

E. V. McCollum, *Professor of Chemical Hygiene*, Johns Hopkins University.

Leonor Michaelis, *Professor* at the University of Berlin, Germany.

John H. Northrup, *Associate Member*, Rockefeller Institute for Medical Research.

Henry R. Procter, *Emeritus Professor*, University of Leeds, England.

S. Edward Sheppard, *Asst. Director of Research*, Eastman Kodak Co.

William Stericker, *Research Chemist*, Philadelphia Quartz Company.

William W. Strong, *President*, Scientific Instrument and Electrical Machine Co.

Lester W. Tarr, *Chief Chemist*, Delaware Agricultural Exp. Station.

Hugh S. Taylor, *Professor of Physical Chemistry*, Princeton University.

Reinhardt Thiessen, *Research Chemist*, Pittsburgh Station, U. S. Bureau of Mines.

Arthur W. Thomas, *Associate Professor of Food Chemistry*, Columbia University.

Donald D. Van Slyke, *Member*, Rockefeller Institute for Medical Research.

H. B. Weiser, *Professor of Chemistry*, Rice Inst.

G. Stafford Whitby, *Associate Professor of Chemistry*, McGill University.

Milton Whitney, U. S. Bureau of Soils.

John Arthur Wilson, *Chief Chemist*, Arthur F. Gallum & Sons Co.

Harper F. Zoller, *Chief Chemist*, The Nizer Laboratories Company.

The Chemistry Bookshelf

A new third edition of Mahin's *Quantitative Analysis* is ready. Much new material has been added; two chapters have been entirely rewritten, and the whole book has been brought up to date in matters of general practice and procedure.

* * * * *

Have you looked up the new methods in Reedy's *Elementary Qualitative Analysis?* This book is occasioning a good deal of interest. Only just published, it is already in use in half a dozen representative colleges.

* * * * *

Two more new editions in the *International Chemical Series* are the second edition of Woodman's *Food Analysis* and the fifth edition of Lord and Demorest's *Metallurgical Analysis.*

* * * * *

Walker, Lewis and McAdams' *Principles of Chemical Engineering* continues to add to its adoption list.

* * * * *

Have you read in Weiss and Downs' *Technical Organization: Its Development and Organization* the material on Contracts, Patents and Trade Secrets, Publication rights of research chemists, and Cost Accounting and Profit?

* * * * *

The second edition of Norris's *Experimental Organic Chemistry* to correspond with the second edition of Norris's *Principles of Organic Chemistry* is now ready.

Regeneration

We have just published *Regeneration From a Physico-Chemical Viewpoint* by the late Jacques Loeb.

The purpose of the book is to show that a simple mass relation can be used as a guide through the bewildering maze of the phenomena of regeneration.

Experimenting with Bryophyllum calycinum, Dr. Loeb found that regeneration is entirely due to physico-chemical agencies.

We have in press also a revision of Dr. Loeb's *Proteins and the Theory of Colloidal Behavior.* The manuscript for this revision was completed just before his death.

Left—EDWARD G. MAHIN, Professor of Analytical Chemistry, Purdue University.
Right—J. H. REEDY, Assistant Professor of Chemistry, University of Illinois.

Liberalizing Studies in the Curriculum of Engineering Courses

(*Continued from page 4*)

taught and the student is expected to plunge into the subject as he would plunge into the sea and swim with all his might. The engineering student, however, should begin only as much of the subject matter as he can safely hold and digest. Economics, or Philosophy, or any of the other "liberalizing" subjects must not throw him out of his track. Nor must they interfere with his conception of the scientific truth obtained by analysis, by observation and experiment. Short hand books on either of these subjects are not intended to swell the "uplift" literature. Their purpose is to stimulate mental activity lying fallow and to enlarge the vision of young engineering students.

A book on Power Plants prepares the student to perform eminent and most useful services. A dialogue of Plato or the work of any of the great philosophers of the world enriches personality and touches the roots of our being.

The teaching of cultural subjects is much more a matter of inspiration than of concrete information. It must be done with a method and an aim that enables graduates from engineering colleges to recognize the superior things in life when they meet them. The teacher's duty is to show the student that the most difficult art is the Art of Living and that man is truly educated only when *he orders his life on principle.*

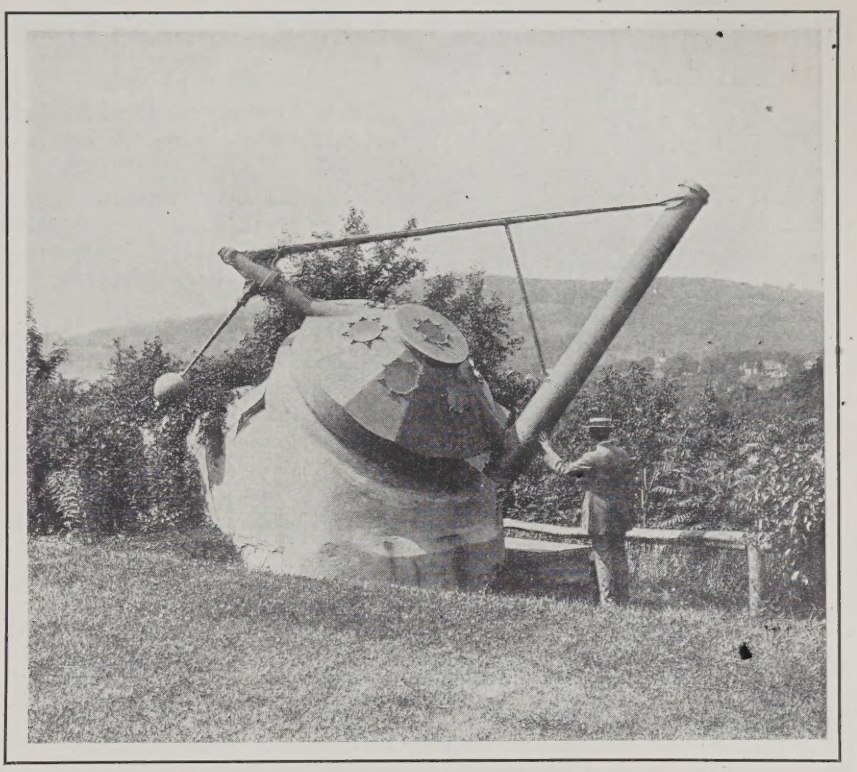
College Professors and The Copyright

The following editorial appeared in the September 15th issue of *Chemical and Metallurgical Engineering.* We reprint it here because it discusses a problem that has often perplexed us.

"College professors are occasionally taken to task for failure to recognize and observe some of the fundamental rules of business that in the commercial world are rigidly respected and enforced. Absorbed in their work of instruction and living in the academic atmosphere of the campus, they are prone to forget the practical considerations that govern business. The fact that their infringements are unintentional makes them no less real to those who are affected.

"The latest voice to be raised against what is probably a thoughtless practice on the part of college professors is that of the National Association of Book Publishers, which observes an increasing disregard of the publisher's copyright. It appears that for one reason or another—the desire to reduce the student's expense or facilitate his collateral reading—the professor has adopted the practice of making mimeographed copies of portions of copyrighted books for distribution among his students. This, of course, is a violation of the copyright law unless permission is obtained from the publisher and author. Many books are written primarily for students, but if the author and publisher are deprived of a considerable part of this market the authors lose their royalties and publishers their profits on books that might have been sold but for the distribution of mimeographed copies of an important chapter or an extended excerpt.

"The practice complained of has grown to such proportions that the members of the National Association of Book Publishers have decided to refuse future requests for permission to mimeograph and distribute parts of copyrighted books. *Chem. & Met.* believes, however, that the consequences of the practice have only to be called to the attention of the teaching profession to insure its discontinuance."



Hartness Turret Observatory from the N. E.
From Bell's THE TELESCOPE.

For All Engineers

The current edition of Fish's *Engineering Economics* is not restricted to the requirements of civil engineers but is available for mining, metallurgical, electrical and mechanical engineers as well.

Speaking of Physics

Smith's *Elements of Applied Physics* meets the needs of students interested primarily in the practical applications of physics.

It aims to bring before the student vividly the universality of physical laws, to help him find in physical laws the explanation of every-day experiences and observations, to show him concretely that the laws of physics are constantly applied in the home, in the field, in industry, in agriculture, everywhere.

The book has been adopted in more than 60 colleges. The third printing, available this fall, includes a number of minor changes and is especially popular.

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If you are looking for problems in physics let us remind you of Henderson's *Problems in Physics*, which presents a collection of 1025 practical problems bearing upon fundamental principles.

* * * * *

Other laboratory manuals for physics courses are:

Goodwin's *Elements of the Precision of Measurements and Graphical Methods.*

Terry's *Advanced Laboratory Practice in Electricity and Magnetism.*

Zeleny and Erikson's *Manual of Physical Measurements.*

Smith's *Electrical Measurements in Theory and Application.*

* * * * *

Have you used the stereoscopic views which accompany Steinmetz's *Four Lectures on Relativity and Space* to illustrate the principles of the Einstein theory to your students?

Engineering in American Industry

Mr. Conrad N. Lauer, General Manager of Day and Zimmermann, Inc., has developed his lecture delivered at Princeton University under the Cyrus Fogg Brackett Lectureship in Applied Engineering Technology into a book called *Engineering in American Industry*. It is a moving picture in book form of the growth of American industry and the contribution of engineering to this development.

This book describes the historical background of modern American industry, traces the actual physical development of American industry and indeed of American life, and then analyzes the ways in which Engineering has contributed to American industrial progress.

It recreates vividly the atmosphere of America one hundred and twenty years ago—1803—the year of the Louisiana Purchase. It pictures the life, the customs and the manners of the American people in the early 1800's—their means of transportation, their political and industrial and engineering development, their primitive communications, undeveloped raw materials, and natural resources—all less than the span of two biblical lifetimes ago.

This introductory material is presented, not in generalities, but with picturesque allusion to such incident as Thomas Jefferson's little known experiments in the discovery of a formula for the construction of mould-boards for plows; or such incident as the new era in mechanism heralded with the celebrated Philadelphia Water Works engine of 1800, that attracted the attention of American Engineers of the day by its high steam pressure of 2½ lb. per square inch.

The author then traces *in graphical form*, from authoritative sources, the growth and development of Industry in the United States. In a series of over sixty plates this information is presented in maps and charts covering a breadth of human activity and a wide range of American industries. Summarized, it is an analysis of the over sixty-fold growth of Industry during the past seventy years—from 1849 to the present.

This is a period during which the railroad mileage of the United States has grown from 10,000 miles to about 260,000 miles. It is a period during which our population grew from less than 25,000,000 to over 110,000,000. These have been the golden years of American Industrial and Engineering Achievement.

Having painted the historical background and traced the actual physical development of American Industry and indeed of American Life, the author then analyzes the ways in which Engineering has contributed to American Industrial Progress.

Properties and Uses of Wood

A new *University of Wisconsin Extension Text* is Koehler's *Properties and Uses of Wood.*

Some of the topics covered are:

What are the capacities and limitations of various kinds of wood?
How to use various kinds of wood to best advantage.
How a tree grows and the structure of wood.
Variation in the weight of wood.
Effects of uneven shrinkage.
How to reduce shrinking and swelling to a minimum during and after manufacture.
Safe working stresses for structural timber.
Factors affecting the nail-holding power of wood.
Practical application of the chemical properties of wood.
Data on air seasoning.
Best methods of kiln drying.
Preservation methods.
Advantages and disadvantages of various woods for specific purposes.
Measurements of timber products.
Grading and standard sizes of lumber.

The Dawes Report

What is "the Dawes Report?"
How does "the Dawes plan" work?
What will it accomplish?
Who will administer the plan?
What problems are likely to confront the administrators of the plan?

These are some of the questions answered in the latest study in the Institute of Economics Series, Moulton's *The Reparation Plan* (Just Published). The book explains, summarizes, simplifies and interprets the reparation plan of the Expert Committees, popularly known as the Dawes plan.

It explains concisely and clearly what the plan is.

It describes the machinery recommended to make the plan function.

It shows what the plan is intended to accomplish and how it will operate.

It makes an appraisal of the plan.

It discusses some of the unsettled points.

Here is a book every engineering teacher interested in world economics will wish to read.

It is the work of Dr. H. G. Moulton, Director of the Institute of Economics.

In addition to its value as an interpretation of the Dawes Plan, thebook preserves in permanent form for reference the full text of the Expert Committee's reports.

Fifteen Years of Technical Books

(*Continued from page 9*)

fields of chemistry, physics, mathematics and English, with a view always of supplying better fundamental textbooks for students, but also into the fields of scientific agriculture and biology, business administration and economics.

These branches seemed logical to us. Hardly had our business started when Scientific Management swept the country. We published much in this field and, before we fully realized. our books on Factory Management had broadened to include one on Office Management. From there it was but a short step to the fields of Business and Economics. Similarly, we published engineering books especially adapted to the requirements of agricultural students which led us by a short path to the field of Scientific Agriculture and Biology. Our contacts with all of these fields revealed the same need that we had found earlier in engineering—of better texts to meet the new and more rigorous educational standards.

Perhaps an individual would hardly speak in this vein at his birthday celebration. To us the summary of our growth means only a statement of the effort we have made to keep pace with the new standards in technical education. We feel that only a small part of the possible growth has been realized and that our long voyage has scarce been undertaken. We feel that in the development of technical education whether it be in engineering, agriculture, business, economics or any other field to which the application of science will produce higher standards, lie the fullest possibilities of the country's growth in usefulness and power.

How to Study

The *New York Times* said editorially in a recent issue:

> "It is probably true that the majority of college students waste much effort and fail to accomplish as much as their energy and intelligence should allow, owing to their ignorance of the best methods of studying. It is neither desirable nor possible to enforce a particular systen of acquiring knowledge; but it is possible and would be most helpful to teach those methods of application which experience has shown to be successful. How to use time to best advantage; how to acquire methodical habits of work; how to take notes and the advantage of using a loose-leaf or card system; how to use the library and books of reference; how to make outlines of lectures or assigned reading; how to use notes in preparing for examinations—these and many other similar things could be taught in such a manner as to show the students the advantages of systematic study."

Swain's *How to Study* is the best textbook for a course such as is here outlined. A copy will be sent to teachers, without charge, upon request.

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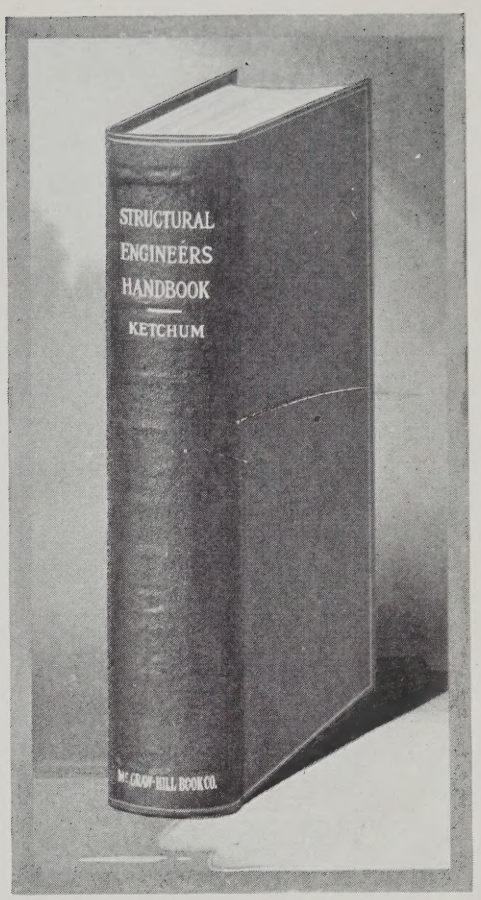

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